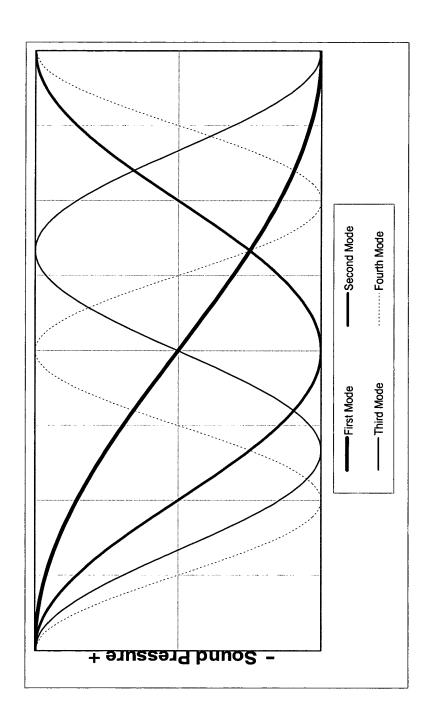
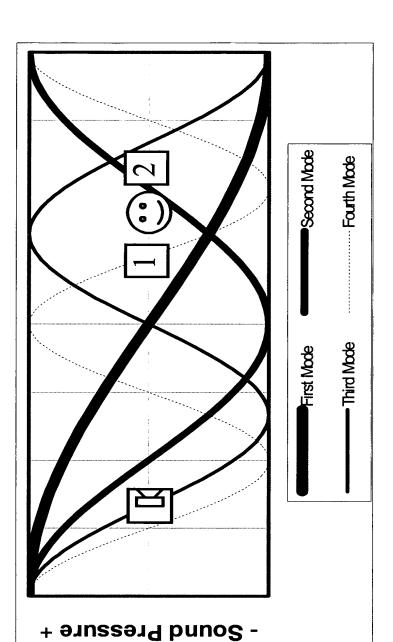
Inventor Names: TODD S. WELTI, ET AL.

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:<u>|</u>G. 2



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**PRIOR ART** 

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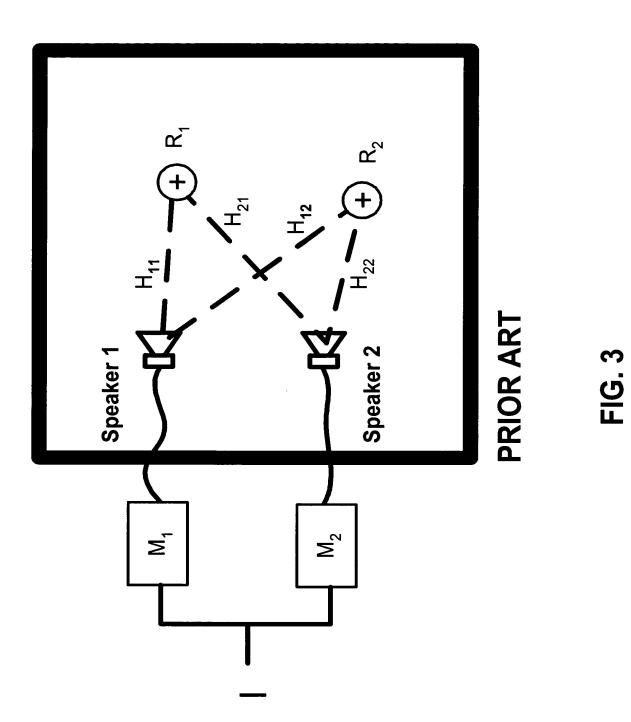
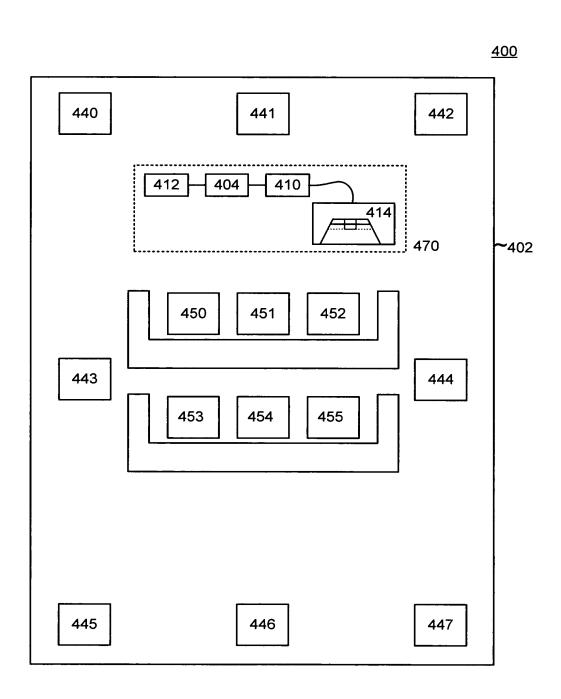
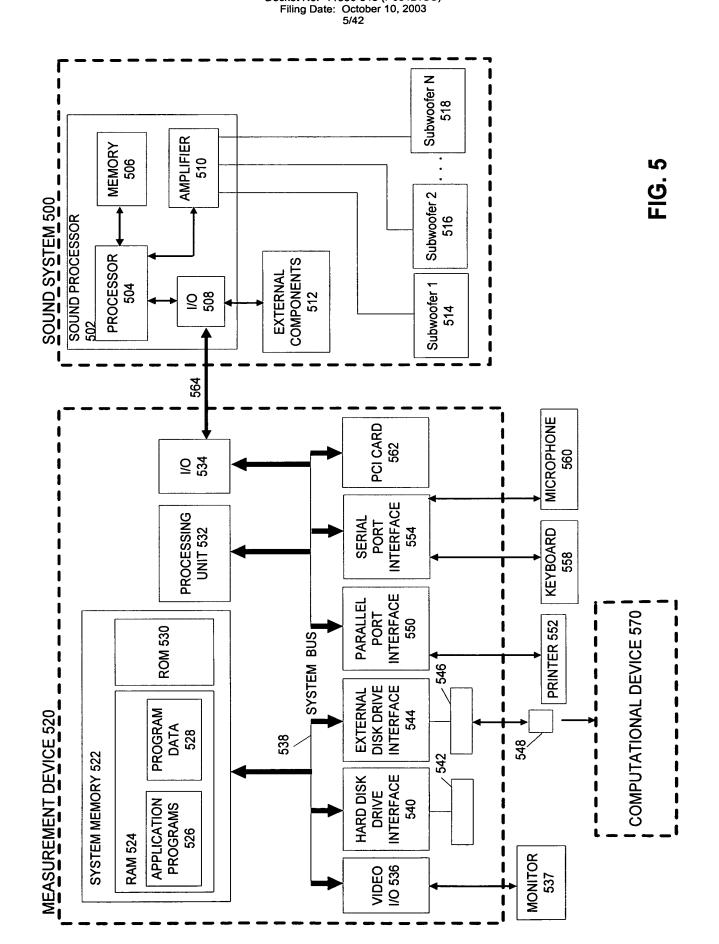
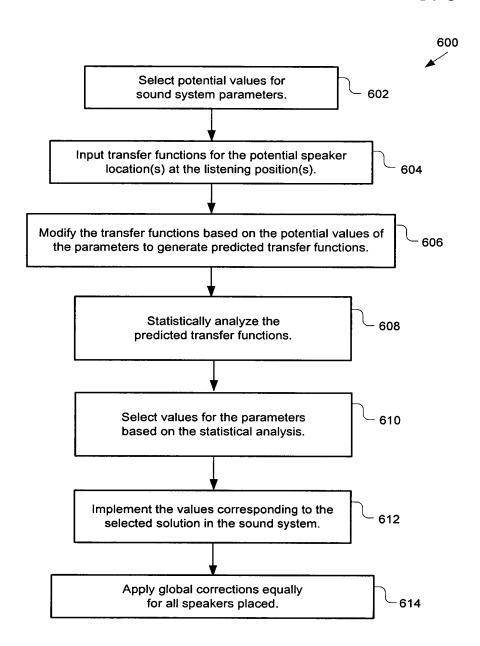


FIG. 4





### FIG. 6



### FIG. 7

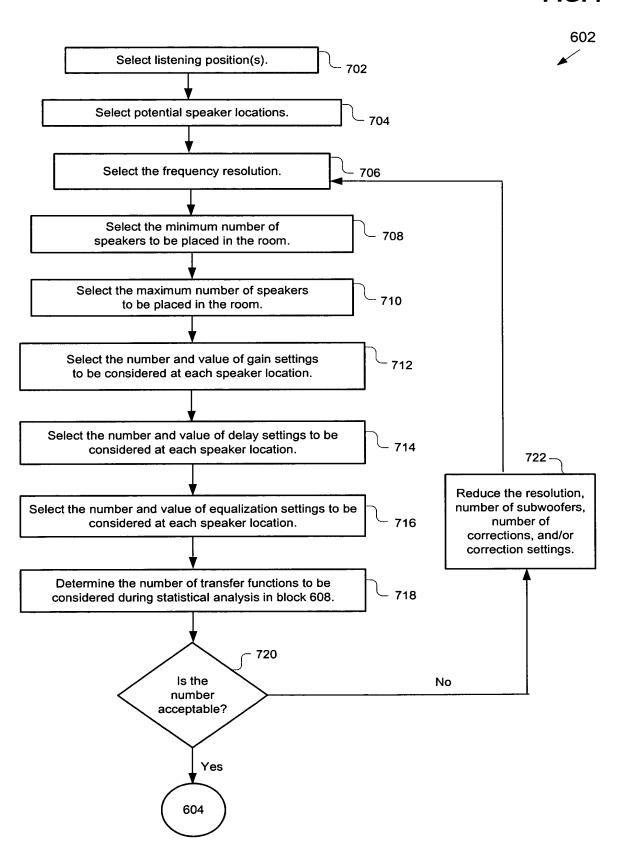
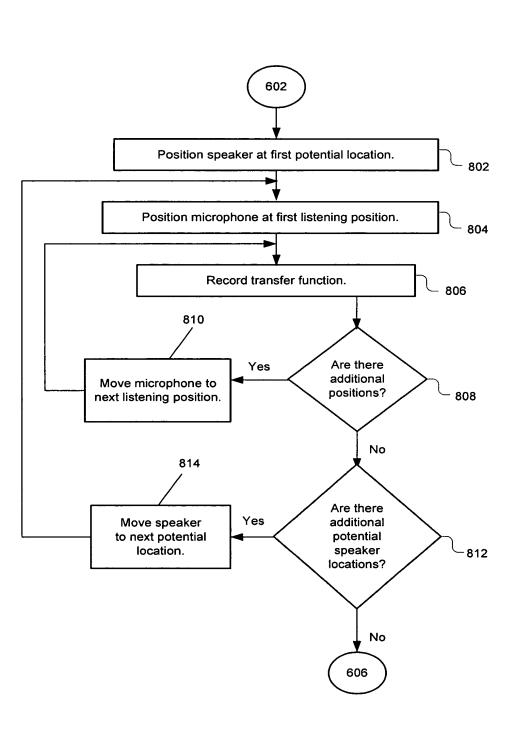


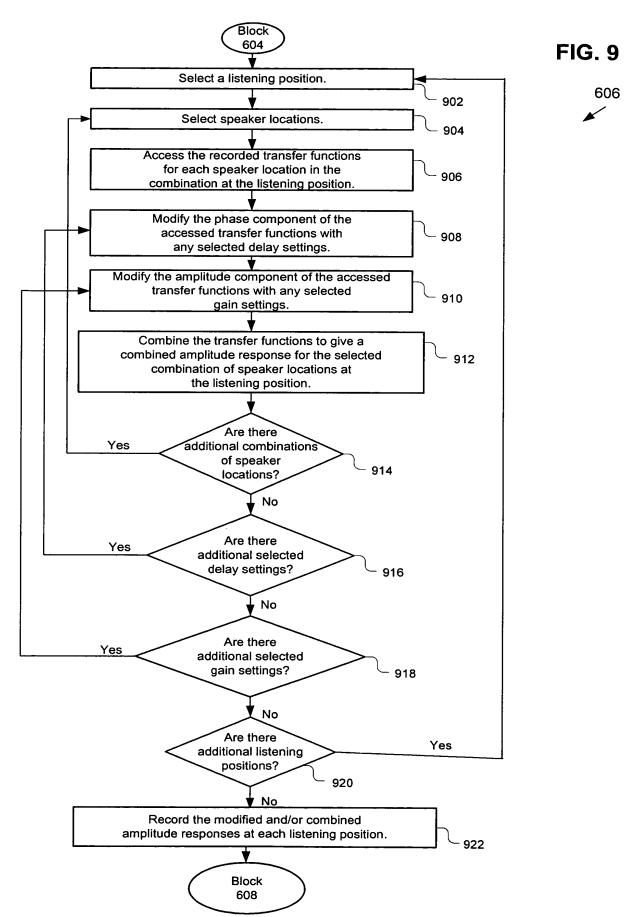
FIG. 8





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62.7919

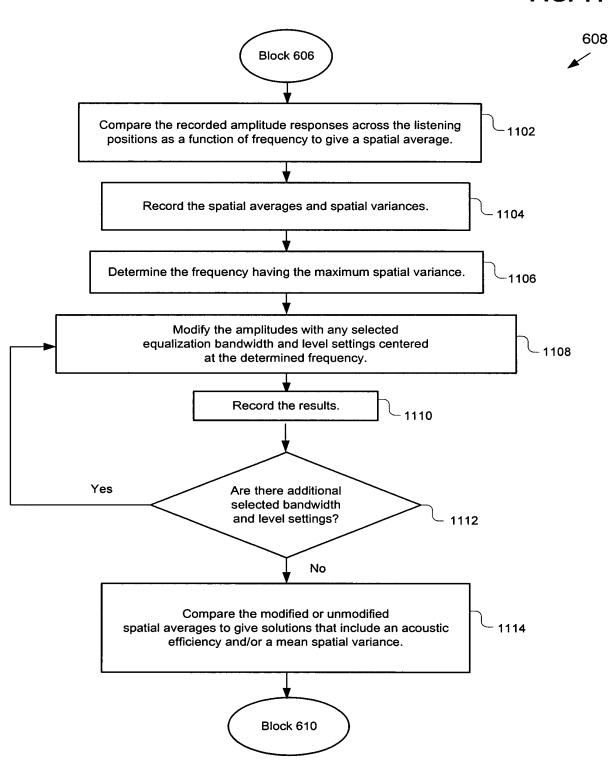
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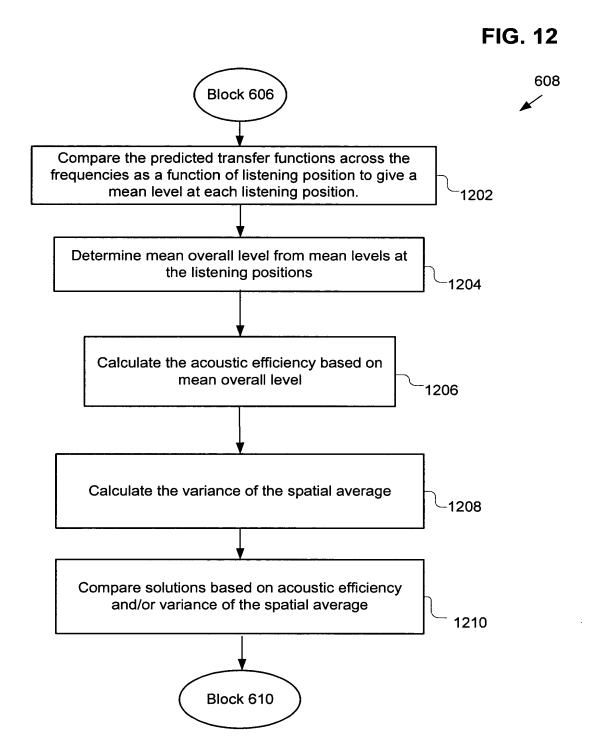
25.80

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	Max-ave of Mean Levels	Mean Level Mean Overall Level Variance of Mean Levels STDEV of Mean Levels Envelope of Mean Levels Max-ave of Mean Levels			80	78	76	7,4	70 70	၊ တ (၁	66	64	62	60	58 8	56 ·	5 <u>4</u>	57	50 6	48	46	44	40	\$ 6	ာ <u>မ</u> တ	34	32	30	28	26	24	22	20	frequency	
1	<b>5</b> 7 ()	,, 0,		-10.16	-5.65	-21.63	-8.14	5 . 3 . 3 .	ь 6.24 03	-2.12 2.21	-6.57	-6.34	-0.95	1.31	4.13	5.60	5.22	0.47	-6.76	-16.58	-15.85	-13.85	-15.00	19.00	-19.06 -19.06	-19.80	-22.44	-19.70	-11.72	-11.73	-17.26	-16.60	-17.71	seat 1	
•				-8.66	-10.12	-9.69	-3.79	-1 93 193	4.01 2.01	0.25	-3.47	-4.22	0.43	2.94	5.71	7.68	7.20	2.07	4.32	-12.29	-13.80	-12.98	-13.59	16.73	-19.48 47.01	-19.50	-22.50	-17.51	-14.14	-14.44	-24.25	-15.62	-16.38	seat 2	<b>7</b> 0
	0.89	-8.22 -8.97 0.86 0.93 2.08 0.89			-6.63	4.21	-1.29	0 01	ည် င ၁ ပ	 2 4	-1.77	-2.79	1.43	3.23	5.20	6.99	5.79	-0.50	-7.56	-15.48	-12.74	-13.78	-14.73	-17.08	-18.22	-21.25	-19.69	-13.79	-13.79	-16.10	-20.21	-15.44	-18.13	seat 3	Raw Data
				-9.74	-11.59	-16.46	-12.48	-9.78	-5.00 -4.37	-18.61	-6.68	-1.93	-0.04	2.15	2.36	2.99	-0.33	-7.13	-12.47	-14.20	-18.62	-21.20	-18.38	-20.89	14 88	17.85	-13.33	8.16	-3.30	-8.19	-10.22	-5.07	-14.51	seat 4	
				-8.08	-5.71	-8.91	-18.59	-10.56	-1 03 103	1.12	4.59	0.77	2.53	6.85	8.14	8.86	5.60	-0.89	-6.48	-10.02	-13.84	-18.60	-21.44	-22.87	-73.61	10.70	-12.41	-8.69	-8.24	-9.83	-13.12	-6.21	-12.99	seat 5	
	r	Level -8.97	Overall	Mean	-7.94	-12.18	-8.86	-5.72	၂၀ ၂၀ ၂၀ ၂၀ ၂၀ ၂၀	3 5 J	-4.62	-2.90	0.68	3.30	5.11	6.42	4.70	-1.19	-7.52	-13.71	-14.97	-16.08	-16.63	-19.25	-19.38	1701	-18.07	-13.5/	-10.24	-12.06	-17.01	-11.79	-15.94	Average_	Spatial
2010	↓ Variance of Spatial Average	variance 15.24	Spatial	Mean	7.50	47.03	47.82	21.88	2.68	7 29	4.3/ 60 03	7.00	1.80	4.50	4.52	5.07	8.45	12.33	9.09	6.80	5.43	13.10	10.41	6.71	10.54	7 80	23.90	25.58	20.54	10.53	31.00	31.88	4.72	Variance	Spatial
1004406	↓ STDEV of Spatial Average	3.52	Spatial	Mean	2.74	6.86	6.92	4.68	1.64	2.ZO	8.75 60.7	2.64	1.34	2.12	2.13	2.25	2.91	3.51	3.02	2.61	2.33	3.62	3.23	2.59	3.25	) · ·	4.90 1.77	) is	4.53	3.25	5.57	5.65	2.17	STDEV	Spatial
3 F 00	↓ Envelope of Spatial Average	8.55	Spatial	Mean	5.94	17.42	17.30	10.57	3.99	5.91	4.91 20.45	.11	3.47	5.54	5.78	5.87	7.53	9.21	8.15	6.55	5.88	8.22	7.85	6.10	8.73	08 g	4 55 4 55	10.04	10.83	7.92	14.03	11.53	5.14	Envelope	Spatial
15 20	₩ax-ave of Spatial Average	4.09	Spatial	Mean	2.29	7.97	7.57	5.73	2.06	3.17	600	ა.ნ/	1.85 67	3.55	3.03	2.44	2.50	3.27	3.20	3.69	2.23	3.10	3.04	2.53	4.50	4 91	ب دري	л С Я 4 Я —	г <u>0.</u> 94	3.07	5.79	6.72	05.7 06.7	Max-ave	Spatial

FIG. 11





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FIG. 13

### Illustrative Solution Sets Ranked by Spatial Variance

Solution	MSV	AE	VSA	S	Gain (dB)	Delay (ms)	Eq. Center (Hz)	Eq Bandwidth (Q)	Eq. Level (dB)
1	4.0	12	18	1, 2	0, 0	0, 5	82, 37	1, 4	0, -6
2	4.4	19	15	1, 2, 3	-6, 0, -12	0, 10, 0	22, 64, 85	1, 4, 1	-12, 0, -6
3	5	14	13	2, 3	-6, 0	10, 0	27, 41	8, 1	-6, <i>-</i> 12
4	6	10	16	3, 4	-12, 0	0, 0	93, 51	1, 8	-12, 0
5	10	23	20	1, 3, 4	0, -12, 0	5, 0	34, 86	1, 1, 8	0, 0, -12
10,000	17	2	56	1, 4	-6, -12	0, 10	27, 91	8, 8	-6, -12, -6

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**FIG. 14** Block 610 612 Position the selected number of subwoofer(s) at the 1402 determined location(s). Implement the determined gain setting 1404 at each subwoofer. Implement the determined delay setting at each 1406 subwoofer. Implement the determined equalization settings - 1408 at each subwoofer. Block 614

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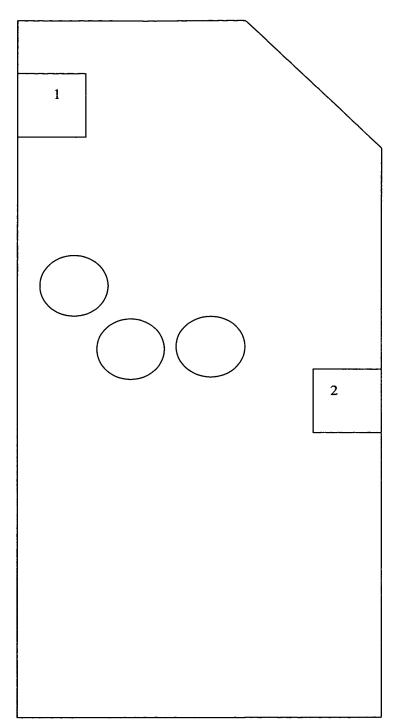
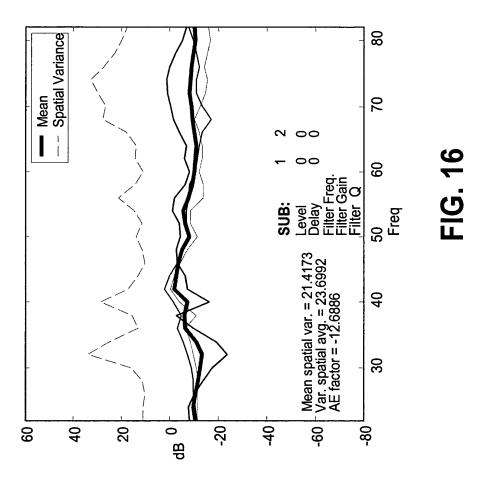
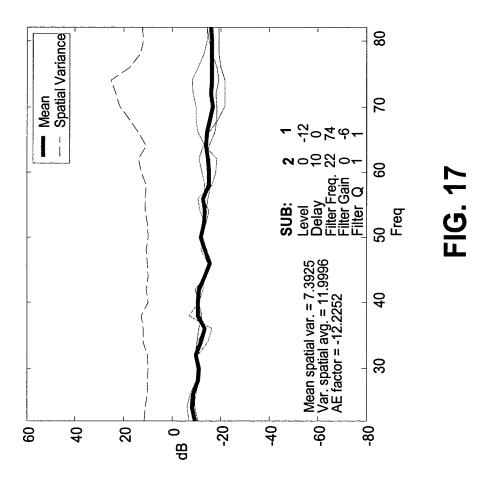


FIG. 15

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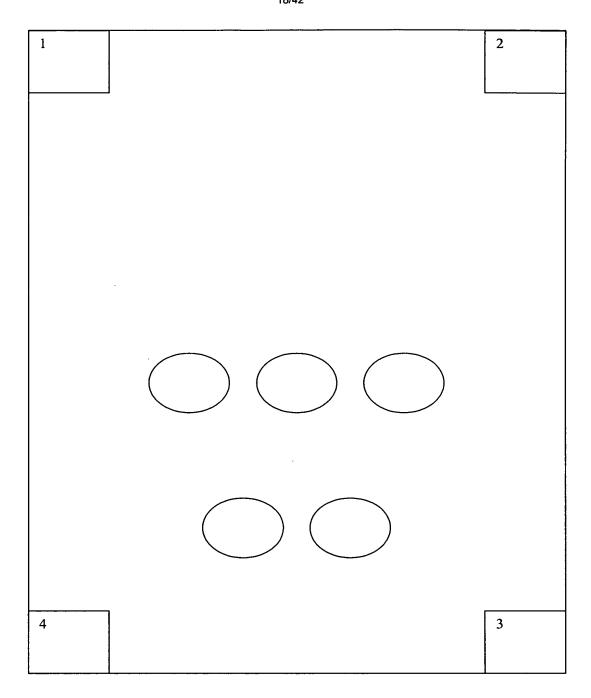
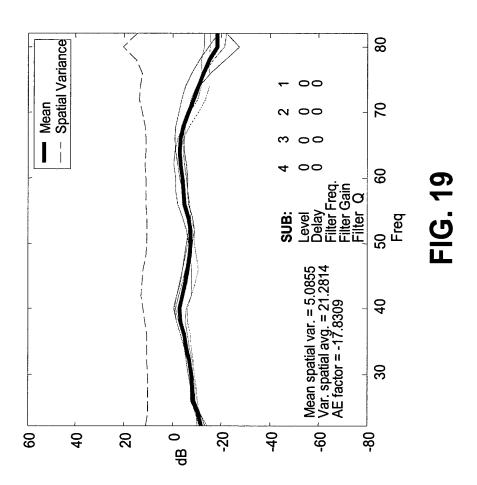
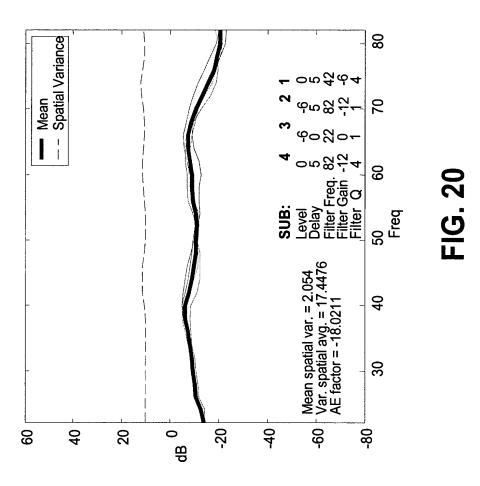


FIG. 18



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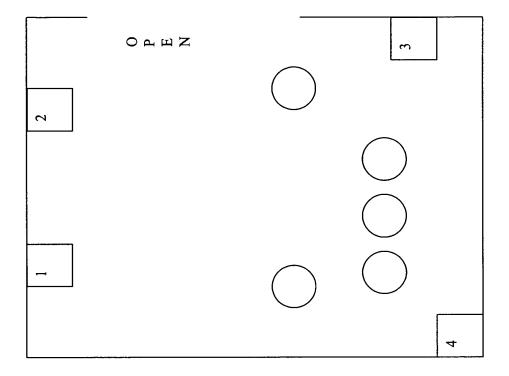
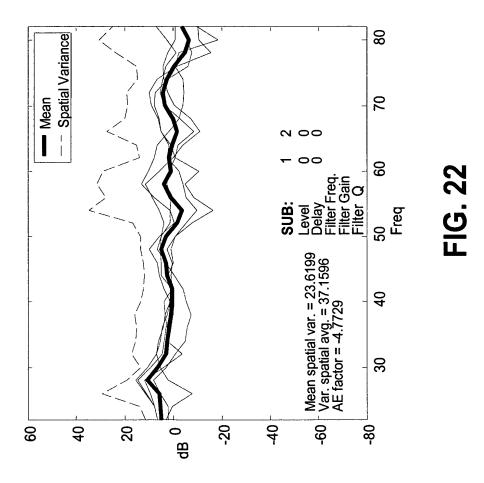
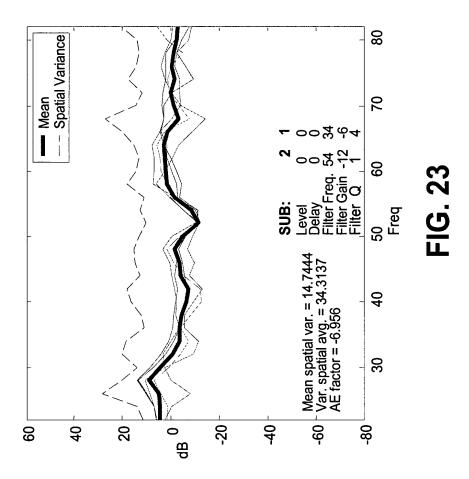
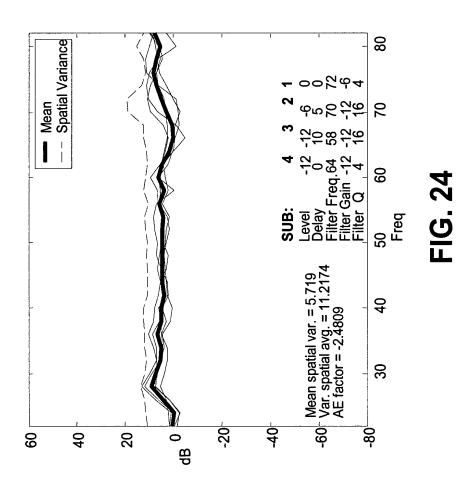


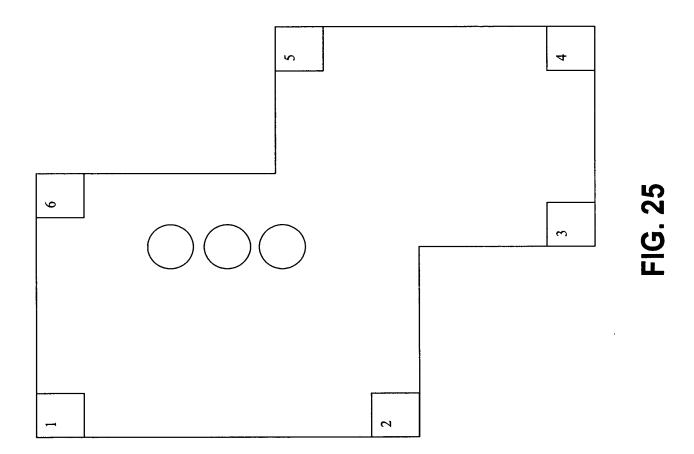
FIG. 21

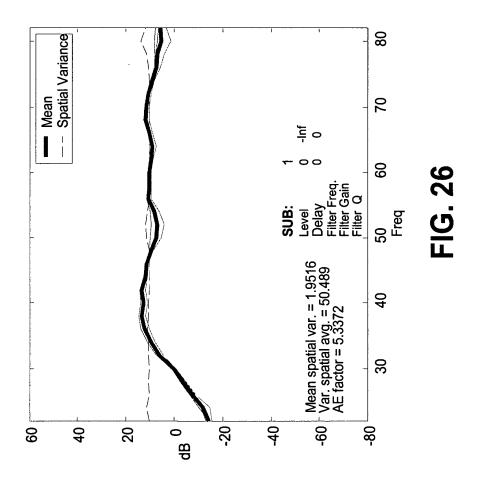


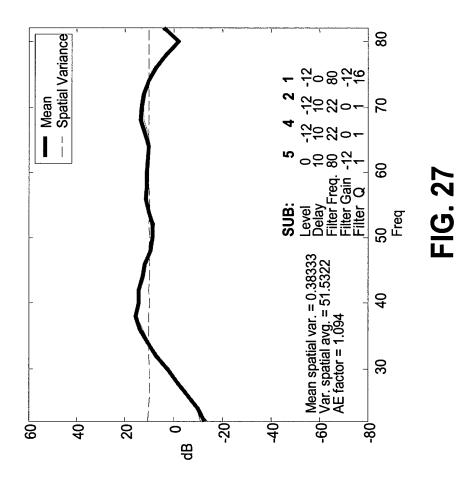




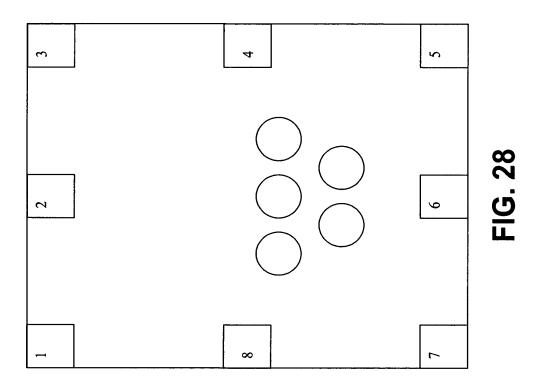
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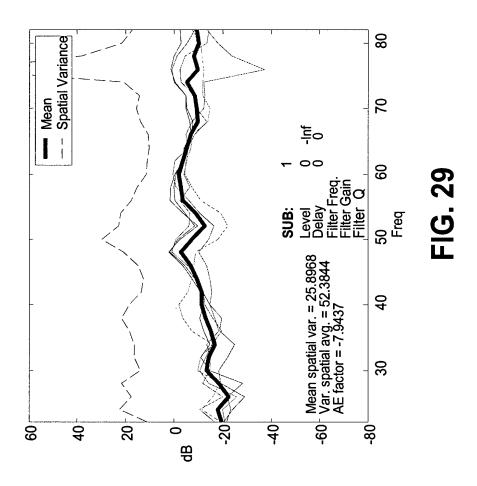


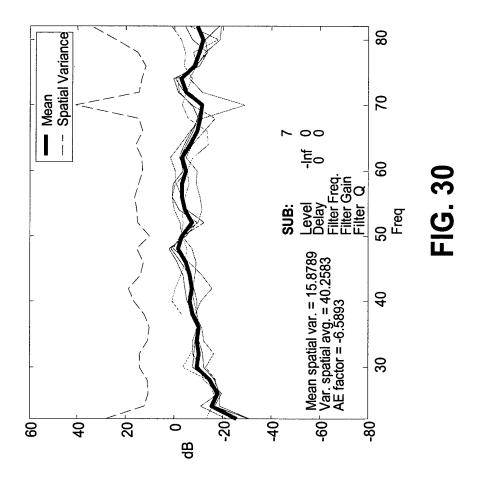


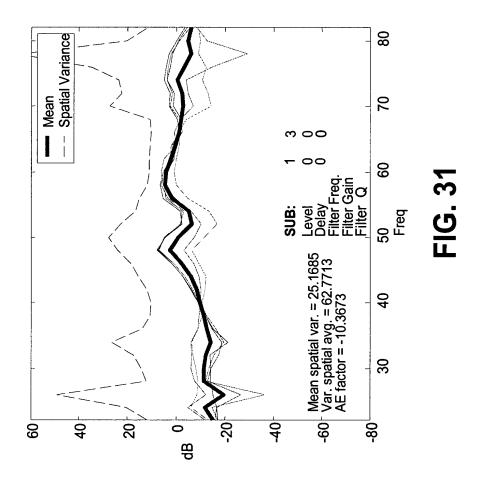


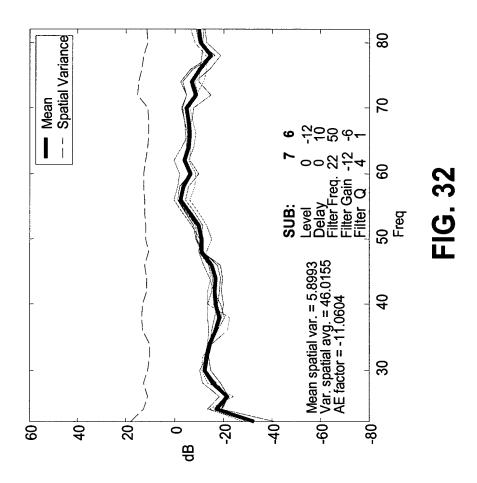
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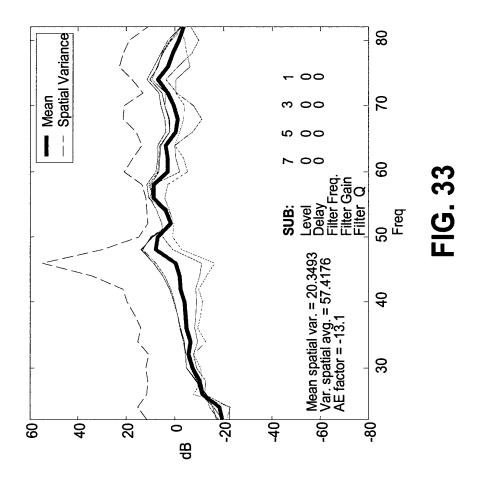






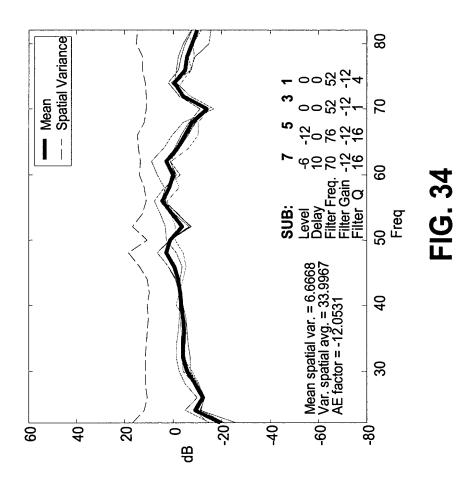


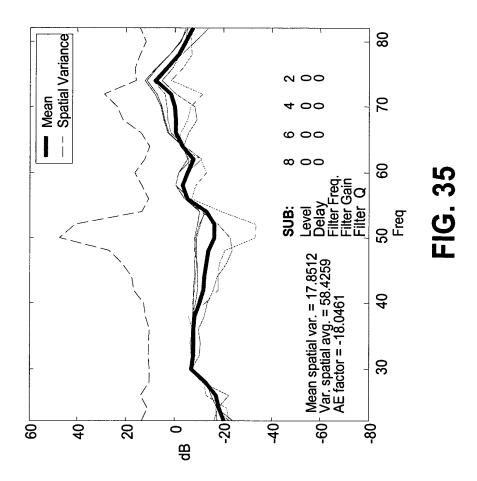


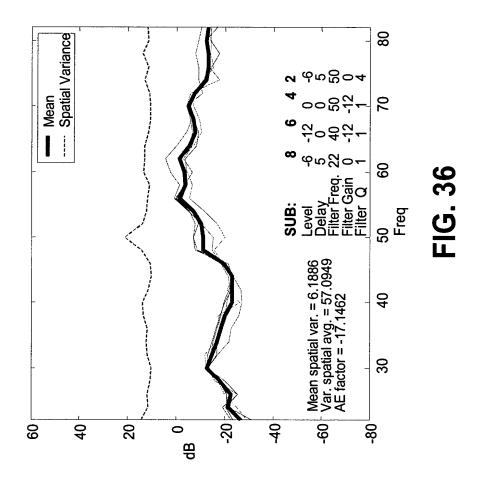


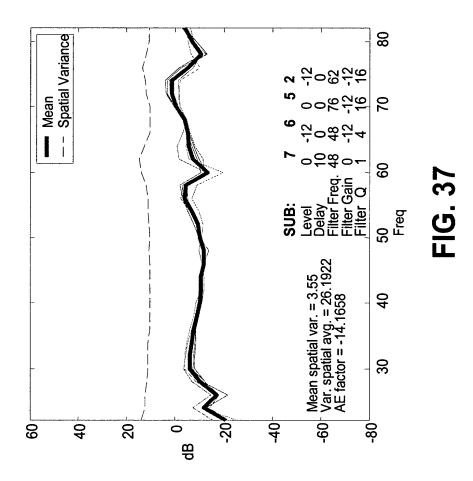
Inventor Names: TODD S. WELTI, ET AL.

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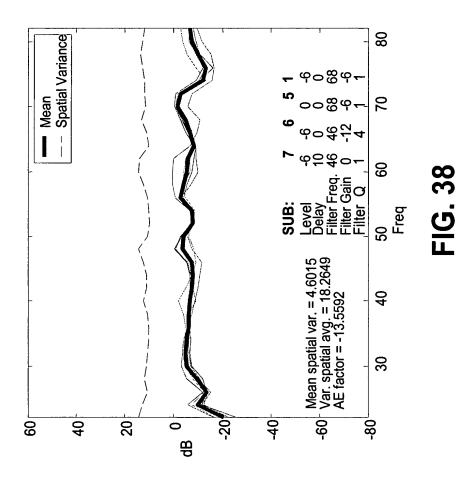






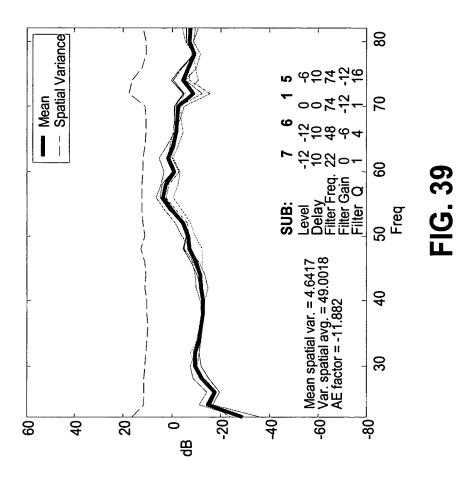
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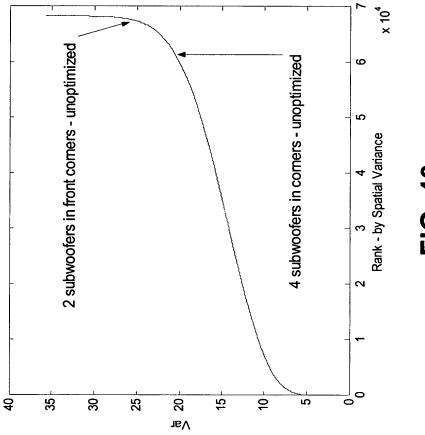


FIG. 40

